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T-2377

Job No.: CTCE/BBMP/W.No.14/KRIDL/CSR-03/778c/QB/2014-15 26.03.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
*NAME OF THE WORK	:	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
REFERENCE	:	EE/DD/WO/259/2014-15 Dated: 28.02.2015
*SAMPLE ID	:	Semi Dense Bituminous Concrete
DATE OF SAMPLING	:	23.03.2015
DATE OF TESTING	:	23.03.2015 to 26.03.2015

The results of the tests conducted on the bitumen sample for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	83	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	46	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	302	Min. 220

*Information is furnished by the Customer/Representative.

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VISHWANATH .C
Quality Manager

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/AIV/2014-15

26.03.2015

Aggregate Impact Value
IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2015

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.52	22.08	21.80

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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26.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2015

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.73	22.54	22.13

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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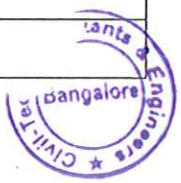
Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 26.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2015



Result : Flakiness Index = **11.53%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index **24.79%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 26.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2015

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Result : Flakiness Index = **11.74%**

Elongation Index = **13.61%**

Result : Combined Flakiness & Elongation index **25.35%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Stripping/2014-15 28.03.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	28.03.2015

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Type of binder : 80/100

Percentage of binder used : 5.0% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.0 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.6	2.64	97.36
2	2.7		
3	2.9		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Sp_Wa/2014-15 28.03.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	28.03.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2023	2025	2028	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1273	1275	1278	
4	Weight of saturated surface dry aggregate in air	W_3 g	2044	2046	2049	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	771	771	771	
6	Weight of oven dried aggregate	W_4 g	2027	2030	2035	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.629	2.633	2.639	2.634
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.688	2.689	2.688	2.688
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.84%	0.79%	0.69%	0.77%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	28.03.2015

Total Weight of Sample: 5675 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	458	8.1	8.07	91.93	90-100	
4.75	3125	55.1	63.14	36.86	35-51	
2.36	589	10.4	73.52	26.48	24-39	
1.18	437	7.7	81.22	18.78	15-30	
0.3	356	6.3	87.49	12.51	9-19	
0.075	415	7.3	94.80	5.20	3-8	

Total Weight of Sample: 5650 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	359	6.4	6.35	93.65	90-100	
4.75	2985	52.8	59.19	40.81	35-51	
2.36	632	11.2	70.37	29.63	24-39	
1.18	459	8.1	78.50	21.50	15-30	
0.3	326	5.8	84.27	15.73	9-19	
0.075	624	11.0	95.31	4.69	3-8	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/AGG/2014-15 28.03.2015

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to roads and drains at Siddeshwara Layout Bagalagunte in Ward No. 14, Bagalagunte, BBMP, Bangalore.
Reference	EE/DD/WO/259/2014-15 Dated: 28.02.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	28.03.2015

Total Weight of Sample: 5600 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	358	6.4	6.39	93.61	90-100	
4.75	3125	55.8	62.20	37.80	35-51	
2.36	312	5.6	67.77	32.23	24-39	
1.18	485	8.7	76.43	23.57	15-30	
0.3	625	11.2	87.59	12.41	9-19	
0.075	358	6.4	93.98	6.02	3-8	

Total Weight of Sample: 5625 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	356	6.3	6.33	93.67	90-100	
4.75	2994	53.2	59.56	40.44	35-51	
2.36	623	11.1	70.63	29.37	24-39	
1.18	478	8.5	79.13	20.87	15-30	
0.3	523	9.3	88.43	11.57	9-19	
0.075	396	7.0	95.47	4.53	3-8	

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